Distributed Systems

COMP90015 2019 Semester 1
Tutorial 11

Things to cover today

Questions about Naming Services

Example questions in examination

Questions

1. What are the advantages and disadvantages of using absolute names as a naming strategy?
2. What are the advantages and disadvantages of a naming strategy based on mount points?
3. What are the advantages and disadvantages of using a global name space naming strategy?

1. What are the advantages and disadvantages of using absolute names as a naming strategy?

Absolute name

• provides a complete address to a file including both the server and path names: <machine name: path name>

Advantages

• Trivial to find a file once the name is given
• No additional state must be kept since each name is self contained (No global state)
• Greater scalability
• Easy to add and delete new names

Disadvantages

• No location transparency
• File is location dependent and cannot be moved
• Less resilient to failure

2. What are the advantages and disadvantages of a naming strategy based on mount points?

Mount Points (used by Sun's Network File System - NFS)

- The client machine creates a set of "local names" which are used to refer to remote locations: mount points
- At boot time, the local name is bound to the remote name
- The operating system must maintain a table to maintain the mapping of what server and path are mapped to each mount point

Advantages:

- Names do not contain information about the file location
- Remote location can change between reboots

Disadvantages:

- Hard to maintain
    - What happens when machines fail?
    - What happens when files are migrated?
- Can lead to confusion since two different local names may map to the same file on a remote system

3. What are the advantages and disadvantages of using a global name space naming strategy?

Global Name Space

• All nodes have an identical name space: the path and name of a file on one machine will be the same on every other machine, regardless of where the file is actually stored
• Dedicated file servers
• Client contacts one of the servers and receives the layout of the distributed file system
• When a user accesses a file, the server sends a copy of it to the client machine where it is cached

Advantages

• Location transparency
• Naming is consistent across all clients
• Storage servers are able to seamlessly move files around because clients always contact the server to learn where files are located

Disadvantages

• Files are cached by clients = challenges in keeping files consistent
• Can lead to performance problems, particularly when the scale of the system grows